



Sacramento
Area Flood
Control
Agency

July 28, 1997

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FI-281

Ms. Kate Hansel
CALFED Bay-Delta Program
1416 Ninth Street, Suite 1155
Sacramento, CA 95814

Subject: Proposals to Establish Comprehensive Management Program and Four
 Habitat Demonstration Projects for the Lower American River Ecosystem

Dear Ms. Hansel:

The lower American River (LAR) ecosystem encompasses highly valued and biologically diverse aquatic and terrestrial resources. Many organizations are actively working to protect and enhance the ecosystem. Recent coordination among stakeholders has identified SAFCA's Floodway Management Plan and the Draft Water Forum Agreement as the central programs for helping to ensure the long-term viability of the LAR ecosystem. The Floodway Management Plan and the Habitat Mitigation Element of the Draft Water Forum Agreement have become the focus of the coordinated effort among the stakeholders.

SAFCA, with the support of the Water Forum and other LAR stakeholders, proposes a comprehensive management program for habitat management and monitoring of the LAR, consistent with the above plans. The program would consolidate and coordinate overall LAR habitat and species monitoring, and implement four demonstration habitat enhancement projects identified as high priority targets for the LAR ecosystem. The program would also establish a Technical Assistance Team representing the broad interests of the stakeholders, and serve as a peer review body and as a clearinghouse for information on the success of habitat studies and enhancement projects.

The proposed program for coordinating LAR management efforts would optimize investments in ecosystem enhancements, ensure efficiency in scientific research, and promote communications among the stakeholders towards the common goal of ecosystem protection. A key feature of the program is the coordination of project-level monitoring, such as the four proposed demonstration projects (submitted separately) and other ongoing projects. The information on overall ecosystem health and habitat project successes would be evaluated with data on species population monitoring and other ecosystem function to make cost-effective management decisions on future ecosystem investments.

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The four demonstration projects proposed would provide needed information on the feasibility of habitat enhancements for priority aquatic species. The key objectives of the four demonstration projects are:

- restore and evaluate unique steelhead and splittail habitat;
- restore and protect shaded riverine aquatic habitat and wetland-slough complex habitat;
- promote establishment of vegetation in a highly scoured zone; and
- demonstration of an alternative bank protection method.

The Sacramento Area Water Forum, representing 46 stakeholders, the City/County Office of Metropolitan Water Planning, and the LAR Task Force which is comprised of 8 Community Groups, 6 Environmental Interests, 2 Recreation Interests, 8 Flood Control Agencies, and 3 Resource Agencies (*see attached Statement of Support*). This demonstration project is consistent with the objectives of CALFED and the goals of other ongoing projects. The AFRP recommends developing a riparian corridor management plan. The Lower American River Technical Team endorses restoration of wetland-slough complexes and riparian habitats along levees in the lower portion of the LAR, and management and restoration of large woody debris, especially in the upper reaches of the LAR.

Sincerely,



Timothy Washburn
Agency Counsel

I. EXECUTIVE SUMMARY

a. Project Title and Applicant Name:

Lower American River Instream Herbaceous Aquatic Cover and Dwarf Shaded Riverine Aquatic Habitat Restoration Plan

Sacramento Area Flood Control Agency
Timothy N. Washburn, Agency Counsel
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b. Project Description and Primary Biological/Ecological Objectives: The proposed project consists of habitat restoration in the upper reaches of the lower American River (LAR), including "dwarf" shaded riverine aquatic (SRA) habitat, instream herbaceous aquatic cover, and large boulders. The project design is based on a pilot study conducted on the LAR in the winter of 1997 that demonstrated the success of using instream herbaceous cover and landscape fabric to promote establishment of vegetation and increase sedimentation in a highly scoured zone. The primary objectives of this program is to increase the success of instream aquatic and riparian habitat restoration efforts.

c. Approach/Tasks/Schedule: Task 1-Fall 1997: Obtain Pre-Construction approvals. Task 2-Early 1998: Evaluate modeling results and prepare site-specific Construction Design. Task 3 1998: Prepare Monitoring Plan to collect data on survival of plantings, plant cover, soil loss/sedimentation, habitat complexity, hydraulic heterogeneity, and abundance of benthic macroinvertebrates and fish. Task 4-Late 1998: Install ballast buckets, landscape fabric, boulders, and vegetation. Task 5-1998 -2001: Implementation of monitoring plan. Task 6-1997-2001: Prepare progress reports describing key activities performed, deliverables submitted, and funds spent and remaining. Task 7-1998-2001: Operations and maintenance activities.

d. Justification for Project and Funding by CALFED: The proposed project will benefit priority species, including steelhead and splittail, by restoring a priority habitat that supports these species; i.e., SRA habitat and instream cover. The primary stressors addressed by the project include loss of shallow water habitat, degradation of instream habitat conditions, and loss of lotic conditions. The creation of dwarf SRA cover will also address elimination of fine sediment replenishment.

A pilot project recently conducted on the LAR found that increasing hydraulic roughness through vegetation and landscape materials was successful in reducing erosion and increasing deposition. This technique can be used to stabilize the restoration site, provide nutrients to the riparian zone, and jump-start the process of establishing SRA habitat along the shoreline. Whereas pole plantings of woody SRA habitat could be subject to scour and erosion, herbaceous vegetation in combination with species such as willow could increase sedimentation and expedite the process of riparian and aquatic restoration.

The proposed project will also serve as a demonstration project that could be applied to areas throughout the delta and its tributaries. The techniques used have been successful in promoting

sediment deposition and establishment of vegetation in the lower American River during a high-flow year in a sediment-deprived stretch of river.

c. Budget Costs and Third-Party Impacts

The total budget costs are \$478,638, according to the following tasks:

Task 1 \$8,050	Task 5 \$172,000
Task 2 \$2,875	Task 6 \$5,750
Task 3 \$3,450	Task 7 \$0
Task 4 \$185,000	Task 8 \$57,500

Third-Party Impacts: Third party impacts, although expected to be minimal, would be evaluated during the environmental review process, including potential impacts to recreationists and cultural resources.

f. Applicant Qualifications: SAFCA is the Project Sponsor. SAFCA and the Water Forum propose H.A.R.T., Inc. to conduct the technical work. H.A.R.T., Inc. are proposed as the SAFCA consultants because of their extensive experience in the lower American River and their significant role in design and development of this project.

Project Management & Design- Jeffrey Hart, Ph.D. Dr. Hart has had considerable success in designing and implementing restoration projects (e.g., Stone Lakes National Wildlife Refuge), biotechnical projects (e.g., Dry Creek, Lower American River), and resource studies (e.g., Cosumnes River, Lower American River). His clients include mostly government agencies and non-profit organizations such as the Sacramento Area Flood Control Agency, Sacramento County Water Resources Division, Ducks Unlimited, and the Nature Conservancy.

g. Monitoring and Data Evaluation: To determine the success of the project, several parameters will be monitored and evaluated for each treatment and adjacent reference sites, including survival of plantings, plant cover, soil loss/sedimentation, habitat complexity, hydraulic heterogeneity, and the relative abundance of benthic macroinvertebrates and fish. Data pertaining to these parameters will be collected at multiple plots for each treatment and at adjacent control sites. Monitoring data pertaining to the parameters identified above will be analyzed statistically, as appropriate, to determine differences among treatments and differences between improved and unimproved sites.

h. Local Support/Coordination with other Programs/ Compatibility with CALFED objectives: The Sacramento Area Water Forum, representing 46 stakeholders, the City/County Office of Metropolitan Water Planning, and the LAR Task Force which is comprised of 8 Community Groups, 6 Environmental Interests, 2 Recreation Interests, 8 Flood Control Agencies, and 3 Resource Agencies (*see attached Statement of Support*). This project is consistent with the objectives of CALFED and the goals of other ongoing projects. The AFRP recommends developing a riparian corridor management plan. CALFED's LAR Technical Team endorses restoration of wetland-slough complexes and riparian habitats along levees in the lower portion of the LAR, and management and restoration of large woody debris, especially in the upper reaches of the LAR.

- a. Lower American River Instream Herbaceous Aquatic Cover and Dwarf Shaded Riverine Aquatic Habitat Restoration Plan
- b. Name of applicant(s): Sacramento Area Flood Control Agency (SAFCA)

Principle investigator(s):

Jeffrey Hart, Ph.D.	Paul Bratovich, Senior Scientist
H.A.R.T.	Mike Bryan, Aquatic Ecologist
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Sacramento, CA 95816	455 Capitol Mall, Suite 600
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- c. Type of Organization and Tax Status: Joint Powers Agency, IRS Exempt
- d. Tax Identification Number: 94-6000529
- e. Technical and Financial Contact person(s):
- | | |
|--|--|
| <u>Financial Contact Person</u> | <u>Technical Contact Person</u> |
| Julie Lienert | Timothy N. Washburn |
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- f. Participants/Collaborators in Implementation: The Sacramento Area Water Forum, representing 46 stakeholders, the City/County Office of Metropolitan Water Planning, and the LAR Task Force which is comprised of 8 Community Groups, 6 Environmental Interests, 2 Recreation Interests, 8 Flood Control Agencies, and 3 Resource Agencies (*see attached Statement of Support*).
- g. RFP Project Group Type - Public Works Construction Projects

III. PROJECT DESCRIPTION

a. Project Description and Approach

The proposed project consists of habitat restoration in the upper reaches of the lower American River (LAR), including "dwarf" shaded riverine aquatic (SRA) habitat, instream herbaceous aquatic cover, and large boulders. The project design is based on a pilot study conducted on the LAR in the winter of 1997 that demonstrated the success of using instream herbaceous cover and landscape fabric to promote establishment of vegetation and increase sedimentation in a highly scoured zone.

CALFED has identified loss of shallow water habitat, degradation of instream habitat conditions, and loss of lotic conditions as stressors to priority fish species in the American River. The proposed project will address these stressors to benefit priority species, including steelhead and splittail, by providing aquatic habitat and increasing hydraulic diversity.

The near-shore edge of the upper portion of the LAR is generally a scour zone, with little development of the dense, riparian vegetation that is characteristic of more downstream portions (see Figure 1). However, there are special types of riverine vegetation adapted to this reach of the river. One is a dwarf SRA component; the plants that comprise this habitat are short in stature, multi-branched, flexible (to bend with the current), and have persistent root systems. The second component consists of instream cover, predominately herbaceous plants, adapted to living in a high-velocity stream environment. A number of plant species are adapted for partial submergence in shoreline environments, such as sedge (*Carex barbara*) and rushes (*Juncus balticus*, *J. effusus*). Instream herbaceous cover will compliment the dwarf SRA plantings. Multi-branched, low-growing plants with high roughness values are adapted to growing in scour zones (as they bend with the swift current), are able to capture sediment, reproduce by vegetative means, and have erosion-resistant root/rhizome systems. Once this process is initiated, sedimentation, bank stability, and habitat diversity increase.

Initial anchoring of plants is critical to the establishment of appropriate vegetation and habitat conditions in the near-shore scour zone. An innovative technique of planting with ballast buckets has been developed to anchor plantings. The ballast bucket technique consists of mixing scoria (volcanic) rock and soil in an organic bucket, and installing the appropriate plants. The porous scoria rock is used for its greater moisture holding capacity, and for the reason that soil and roots will permeate and entwine the entire rock mass, resulting in a composite living structure. The weight of the structure will aid in the initial anchoring of the plant to enable it to withstand high velocity currents. The plants will be allowed to grow in the buckets for several months prior to planting to ensure that the roots are thoroughly growing within the rock/soil mixture. Ballast buckets can be planted at various shallow depths in the water, at the water's edge, or on the shore. Once planted, the roots will grow out from the organic bucket exterior, securing the plant to the site. After approximately two years, the buckets will thoroughly decay. Coir (coconut) fabric will be used to cover the planting site, and will serve the purpose of encouraging deposition and reducing scour. Figures 2 and 3 demonstrate the techniques of installation.

The experimental design of the project includes testing of combinations of landscape fabrics used with the plantings. During the first year, four cover treatment combinations (i.e., no coir, coir, coir with

straw, and coir with inner fabric; see Figure 4) will be planted with the ballast buckets in test areas at each of the project sites. This will determine which combination is the most cost-effective and successful for application throughout the project site. It is anticipated that this will increase the effectiveness of this project, as well as providing information that will be useful to future restoration projects at other locations.

For the dwarf SRA habitat plantings, several plant species and types will be used: sandbar willow (*Salix exigua*), dusky willow (*Salix melanopsis*), sedge (*Carex barbarae*), creeping wildrye (*Leymus tritoides*), baltic rush (*Juncus balticus*), and wild rose (*Rosa californica*). These species, as well as herbaceous species (e.g., annual grasses) will be planted in ballast buckets and installed within the cobble matrix. The plants will be placed at slightly different elevations, as determined by different plant species requirements, to increase survival in variable water years.

Rounded boulders, 2-3 feet in diameter, will be interspersed with the ballast bucket plantings. Post-emergent steelhead fry typically use shallow, slow-moving littoral zone habitats. As steelhead grow, they move into deeper, faster water. Oversummering juvenile steelhead are most frequently observed in the American River in relatively fast-flowing areas characterized by hydraulic roughness elements which provide non-uniform, semi-turbulent flow characteristics (B. Snider, CDFG, pers. comm. 1997; P. Bratovich, pers. comm., 1997). Placing boulders in the restoration sites will increase the hydraulic diversity of these areas and increase their habitat value for juvenile steelhead. It is anticipated that the addition of boulder clusters would also provide refuge for juvenile fish during high flows.

A critical component of instream object placement (i.e., ballast-bucket plantings and boulders) is elevation. Thus, to benefit post-emergent fry, instream objects should be located such that they are in littoral zone areas over a range of flows which typically occur from February through June. To benefit oversummering steelhead, instream objects should be placed such that they are available in deeper, faster areas utilized by juvenile steelhead at the range of flows that typically occurs from July through September.

To determine appropriate elevations for the placement of instream objects, stage discharge relationships for the LAR (in the vicinity of the project site) will be evaluated for the 70-year hydrologic period of record. Discharge records will be examined for the February through June and July through September periods to determine the average stage (i.e., elevation) that occurs during these periods. The typical variation in stage among years also will be determined for each period. Understanding the river's seasonal stage-discharge relationships will facilitate placement of the plantings and boulders in locations that will be most beneficial to juvenile salmonids over a range of flows.

b. Location and Geographic Boundaries of Project

The project will be implemented at two sites on the upper reaches of the lower American River. The first site is located on an island at River Mile 21, and is 800 feet in length. The second site is located at River Mile 19, at Sacramento Bar, and is 700 feet in length (see Figure 5). Both project sites are located within Sacramento County.

c. Expected Benefits

The proposed project will benefit priority species, including steelhead and splittail, by restoring a priority habitat that supports these species; i.e., SRA habitat and instream cover. The primary stressors addressed by the project include loss of shallow water habitat, degradation of instream habitat conditions, and loss of lotic conditions. The creation of dwarf SRA cover will also address elimination of fine sediment replenishment.

A pilot project recently conducted on the lower American River found that increasing hydraulic roughness through vegetation and landscape materials was successful in reducing erosion and increasing deposition. This technique can be used to stabilize the restoration site, provide nutrients to the riparian zone, and jump-start the process of establishing SRA Cover along the shoreline. Whereas pole plantings of woody SRA Cover could be subject to scour and erosion, herbaceous vegetation in combination with species such as willow could increase sedimentation and expedite the process of riparian and aquatic restoration.

The proposed project could also serve as a demonstration project that could be applied to areas throughout the delta and its tributaries. The techniques used have been successful in promoting sediment deposition and establishment of vegetation in the lower American River during a high-flow year, in a currently sediment-deprived stretch of river.

Another ecological benefit of the proposed project is that once the plantings are completed, natural processes will be used to facilitate the restoration process. The plantings will include decomposable ballast buckets.

d. Background and Biological/Technical Justification

Historically, over 125 miles of riverine habitat were available for anadromous fish in the American River system. In 1955, with the closure of Nimbus Dam, upstream access to anadromous fishes was blocked, and all anadromous fishes are now restricted to the lower 23 miles of the LAR extending from Nimbus Dam to the mouth of the American River at its confluence with the Sacramento River.

A pilot study was conducted on the LAR in the winter of 1997 to evaluate the success of establishing plants on revetment and using a combination of herbaceous plants and landscape fabric to promote establishment of vegetation and increase sediment deposition in a sediment-deprived reach of the river. Soil was placed on revetment, and different combinations of sedge, annual grasses, coir fabric, and an inner blanket were used to test the relative effectiveness of the different treatments (see figures 4 and 5). After more than three months of flooding, it was determined that the application of coir with an

inner blanket, annual grasses, and sedges, was the most effective reducing rock exposure. Rock exposure was used as an indicator of erosion; a decrease in rock exposure was considered indicative of deposition. Soil alone resulted in a 64% increase in rock exposure. Soil with annual grasses resulted in no change in rock exposure. Plots with soil and sedges showed a 25% increase in rock exposure. Plots with coir and annual grasses resulted in a decrease of 11% in rock exposure. Plots with coir, inner blanket, annual grasses, and sedge resulted in a 19% decrease in rock exposure. The conclusion of the study was that increasing roughness through herbaceous plants and landscape fabric could protect revetment sites from scour and encourage sediment deposition. This process could be used to increase the success of instream aquatic and riparian habitat restoration.

e. Proposed Scope of Work

Task 1: Pre-Construction Approvals. Initiate all permitting processes required prior to construction and project implementation. Beginning the permitting process, in addition to coordination with the Lower American River Task Force and other stakeholders, will define any remaining design issues and informational needs. This task will take place in conjunction with other tasks, continuously during the early stages of the project until all the data necessary to obtain permits has been generated and all the appropriate construction approvals are awarded. Deliverable(s) of this task:

- Memorandum providing confirmation of construction approvals.

Task 2: Site-Specific Construction Design. Evaluation of hydrologic modeling results for the 70-year period of record, including stage-discharge relationships by month. The hydrologic modeling results will be used to determine placement of ballast buckets and boulders. Preparation of base topographic map and planting schematics are also a part of this task. Deliverable(s) of this task:

- Final Design Report

Task 3: Monitoring Plan. Based on the site-specific construction design and hydraulic modeling results, prepare a project monitoring plan to collect data on survival of plantings, plant cover, soil loss/sedimentation, habitat complexity, hydraulic heterogeneity, and the relative abundance of benthic macroinvertebrates and fish.

Deliverable for this task:

- Monitoring Plan.

Task 4: Construction. This task will include solicitation of implementation of the planting design, placement of ballast buckets, landscape fabric, and boulders, and associated administrative expenses. Deliverable for this task:

- Final Construction Report.

Task 5: Monitoring and Data Collection and Evaluation. Monitoring and data collection will be carried out for three years following project construction according to the Monitoring Plan developed in Task 3. Further discussion on monitoring and data collection activities is described in Section f which follows this scope of work. Deliverable for this task: Annual monitoring reports.

Task 6: Progress Reports. As a part of invoicing activities, progress reports will be prepared, describing key activities performed and deliverables submitted during the invoicing period. Included in these

reports will be financial statements describing funds spent and remaining. The cost of this task will be included in overhead costs. Deliverable for this task:

- Progress Reports.

Task 7: Operation and Maintenance: SAFCA has indicated that it would assume responsibility for operation and maintenance activities, including removal of exotic species and long-term monitoring.

f. Monitoring and Data Evaluation

To determine the success of the project, several parameters will be monitored and evaluated for each treatment and adjacent reference sites, including survival of plantings, plant cover, soil loss/sedimentation, habitat complexity, hydraulic heterogeneity, and the relative abundance of benthic macroinvertebrates and fish. Data pertaining to these parameters will be collected at multiple plots for each treatment and at adjacent control sites. Monitoring data pertaining to the parameters identified above will be analyzed statistically, as appropriate, to determine differences among treatments and differences between improved and unimproved sites.

Average rates of survival for each of the plant species used in the restoration will be determined for specified intervals throughout the monitoring program. Standard quadrat techniques will be employed to determine species-specific densities, which will be compared to densities at the time of planting to calculate interval survival rates (in percent). Following the appropriate transformation of percent data (i.e., arcsin, square root), species-specific interval survival rates will be compared among treatments using analysis of variance (ANOVA) procedures. Plant cover, the proportion of an area covered by the vertical projection of plant crowns or basal area to the riverbed, also will be monitored using one or more standard methods (e.g., the Braun-Blanquet cover abundance scale, line intercept, or point intercept) and compared among treatments. The Braun-Blanquet cover abundance scale also will be used to assess sedimentation. The percent cover of larger riverbed substrate (e.g., gravel and cobble) will be determined for each treatment and reference sites before and after winter flood events. Differences in both plant and soil cover among treatments will be described and statistically assessed using an appropriate rank-sum statistical procedure (e.g., Friedman's test). Soil loss will be described at various points in time using the soil material associated with the ballast buckets as standardized reference points.

Differences in habitat complexity will be evaluated based on changes in plant cover, density, sedimentation/soil loss, and hydraulic complexity among treatments. Hydraulic complexity will be determined by measuring current velocities at specified intervals along multiple line transects running perpendicular to shore. This will be conducted within multiple plots for each treatment. Locations for these transects will be determined using randomization procedures.

Benthic macroinvertebrates community diversity, similarity, and structure will be determined for each treatment. Organism counts will be made on multiple dredge samples collected within several different plots representing each treatment, and indices and densities calculated from these values. Finally, the relative abundance of juvenile steelhead and splittail using improved littoral zone habitats will be compared to the relative abundance of these species at unimproved sites using ANOVA procedures on log-transformed catch-per-unit-effort data.

g. Implementability

The proposed pilot project will be constructed on Sacramento County-owned property in the Lower American River Parkway. The project has direct ties to ongoing bank protection projects on the lower American River (SAFCA, Corps, DWR, American River Flood Control District, CDFG and USFWS) and the support of the Lower American River Task Force. Environmental review and permitting will be completed by SAFCA.

Because the project would use techniques to minimize disturbance and avoid the use of heavy equipment, environmental permitting requirements are not anticipated to be extensive. Such requirements could include various permits from County, State, and Federal resource management agencies, as well as compliance with CEQA and NEPA. In the event that steelhead are listed under the Endangered Species Act (ESA) by NMFS, habitat modifications and monitoring of steelhead would require Section 10 ESA permits. Streambed alteration agreements will be required from CDFG. Cultural resources surveys may need to be conducted. Activity permits will also be required from County Parks, as the entire project is on County Park lands.

Because the project design will be based on stage-discharge evaluations of the 70-year hydrologic period of record, the project would not be expected to be sensitive to changes in hydraulic conditions.

IV. COSTS AND SCHEDULE TO IMPLEMENT PROPOSED PROJECT

a. Budget Costs

See attached cost tables

Total cost for this project would be \$478,638, including overhead charges for administration of the project by SAFCA and a 10% contingency. The above amount also includes \$57,500 for operation and maintenance of the project, which will be funded by SAFCA. The total amount requested for funding by CALFED is \$421,138. Because this is a demonstration habitat restoration project, it is anticipated that funding by CALFED will leverage future restoration actions on the American River and in the delta. Cost-sharing by SAFCA and CALFED will promote and expedite efficient, cost-effective habitat management of the LAR.

b. Schedule Milestones

The preliminary design of the project was completed in the first half of 1997. Task 1 and 2 of the project, permitting and site-specific construction design, will be completed in fall of 1997. Tasks 3 and 4, development of a monitoring plan and construction, can be completed from late fall 1997 through summer 1998. A final construction report will be available by fall 1998. Task 5, monitoring and evaluation, will begin with baseline monitoring in the fall of 1997, and will continue following completion of construction for three years. Annual monitoring reports will be completed in 1999, 2000, and 2001. Task 6, progress reports, will be ongoing during the years funded by CALFED; i.e., 1997-2000. Task 7, operation and maintenance, including long-term monitoring, will be the responsibility of SAFCA, and is expected to be completed by 2003.

c. Third Party Impacts

Third party impacts, although expected to be minimal, would be evaluated during the environmental review process, including potential impacts to plant and animal communities, recreationists, and cultural resources.

As part of the proposed Comprehensive Habitat Management Program and associated habitat restoration projects, SAFCA will use the Corps of Engineers' new hydraulic model of the river to evaluate the compatibility of habitat restoration projects with flood control objectives. Future vegetation management and proposed habitat restoration or mitigation projects will be evaluated based on hydraulic modeling verification of site-specific or reach-by-reach floodway standards. Hydraulic model results will confirm that habitat expansion projects are not in conflict with public safety thresholds (e.g., adequate freeboard, avoidance of seepage risk, levee protection). Model results will also be used to identify sites where surplus channel capacity exists, and thereby identify suitable sites for habitat restoration projects, or to recommend altered or reduced channel maintenance procedures (e.g., vegetation removal) to promote greater aquatic and riparian habitat quality at the sites.

Composite channel roughness coefficients will be developed at the riparian platform location to compare existing conditions with floodway design standards and proposed habitat modifications.

Standardized criteria will be developed to support acceptance, rejection, or design modification of proposals to meet ecosystem and floodway objectives.

V. APPLICANT QUALIFICATIONS

The project will be designed and implemented under the direction of the SAFCA Executive Director, F.I. "Butch" Hodgkins. A support management team consisting of SAFCA staff and its technical advisors (H.A.R.T., Inc., Surface Water Resources, Inc.) will work with the Technical Assistance Team and LAR Task Force on final design of project features and deliverables. The management team and primary project roles are shown below:

Timothy Washburn	Project Manager
Jeffrey Hart	Terrestrial Habitat Design and Monitoring
Paul Bratovich	Aquatic Habitat Design and Monitoring
Mike Bryan	Aquatic Habitat Design and Monitoring
Amy Harris	Aquatic Monitoring and Endangered Species
George "Buzz" Link	Hydrologic Modeling
Walter Bourez	Hydrologic Modeling
Rick Lind	Environmental Compliance and Regulatory Permitting

TIMOTHY WASHBURN is the General Counsel for the Sacramento Area Flood Control Agency with responsibility for planning and environmental review of regional flood control projects, supervision of consulting engineers, biologists, and associate counsels in preparation of project reports and related documents. Other activities include coordination of planning activities with the U.S. Army Corps of Engineers, U.S. Bureau of Reclamation, U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, State Reclamation Board, State Department of Water Resources, State Department of Fish and Game, State Historic Preservation Officer, City of Sacramento, County of Sacramento, County of Sutter, Reclamation District 1000, and the American River Flood Control District. Notable projects include the American River Watershed Investigation, Natomas Area Flood Control Improvement Project, Natomas Basin Habitat Conservation Plan, and Interim Reoperation of Folsom Dam and Reservoir.

JEFFREY A. HART has had considerable success in designing and implementing restoration projects (e.g., Stone Lakes National Wildlife Refuge), biotechnical projects (e.g., Dry Creek, Lower American River), and resource studies (e.g., Cosumnes River, Lower American River). His clients include government agencies and non-profit organizations such as the Sacramento Area Flood Control Agency, Sacramento County Water Resources Division, Ducks Unlimited, and the Nature Conservancy. Hart has successfully completed restoration contracts with Ducks Unlimited, and has made considerable progress with CalTrans Beach Lake Mitigation site.

PAUL M. BRATOVICH has worked as a fisheries consultant and water resources specialist in California for the past 14 years. As a recognized fisheries expert of Central Valley streams and the Bay/Delta, with particular expertise on the American River, he is actively participating in a broad range of forums in a variety of consultative, advisory, and technical expert capacities. For example, Mr. Bratovich is presently serving as a lead consultant to the Sacramento Area Water Forum on behalf of the joint Sacramento City-County Office of Metropolitan Water Planning. As a fisheries expert on the Bay/Delta Oversight Council, Mr. Bratovich served on both the Aquatic Resources Technical Advisory Committee and on the Lower Sacramento River and Delta Tributaries Technical

Team, as part of the Anadromous Fish Restoration Program (AFRP) of the Central Valley Project Improvement Act (CVPIA). He was assigned responsibility for the American and Yuba rivers, and continues to provide technical expertise regarding instream flow and habitat issues to the U.S. Fish & Wildlife Service. Mr. Bratovich has participated in a variety of other interagency consultative teams including the Interagency Ecological Program (IEP) Resident Fish Project Work Team and the Delta Smelt and Sacramento Splittail Co-applicants Technical Subcommittee, and continues to serve as a technical expert of the Lower American River Operations Working Group and the Alameda County Superior Court Lower American River Technical Advisory Committee in support of the Environmental Defense Fund (EDF) et al. vs. East Bay Municipal Utility District (EBMUD).

He has served as Principal-in-Charge on a number of project initiatives regarding lower American River fisheries issues and has been responsible for the design, implementation, and report preparation of multi-faceted aquatic ecology investigations of the lower American River. Investigative elements have included habitat classification and mapping, application of the Instream Flow Incremental Methodology (IFIM), estimation of chinook salmon abundance and distribution by habitat type, chinook salmon micro-habitat suitability data acquisition, and water temperature monitoring including the preparation of a water temperature calibration report for Folsom Reservoir and the lower American River.

MICHAEL D. BRYAN, PH.D., holds a doctorate degree in fisheries biology and toxicology, and has over 10 years of combined research and consulting experience. He has extensive expertise in the areas of environmental toxicology, ecological risk assessment, fisheries biology, aquatic ecology, experimental design and statistics. His past work has focused on the toxicological effects of heavy metals, organophosphorus insecticides, stormwater runoff and wastewater treatment plant effluent on freshwater aquatic organisms. Recently, Dr. Bryan developed the experimental design and field sampling procedures and coordinated field work activities for a North American sediment contamination survey to determine the range of concentrations of polydimethylsiloxanes (PDMS) in marine and fresh water sediments. Dr. Bryan's other recent projects have involved serving as a fisheries expert on behalf of the Anadromous Fish Restoration Program of the Central Valley Project Improvement Act (CVPIA), monitoring urban stormwater runoff water quality, identifying causes for recent declines in Bay/Delta fishery resources, evaluating potential fisheries impacts from Folsom Reservoir interim reoperation, and conducting fisheries field surveys in the Central Valley.

AMY HARRIS is an aquatic ecologist with a strong background in biological sciences. Her expertise is in design and implementation of monitoring programs for freshwater ecosystems. Ms. Harris has prepared and provided support for aquatic and terrestrial resource impact analyses for CEQA and NEPA documents. She has conducted aquatic and terrestrial surveys for use in habitat monitoring and planning, including riparian vegetation surveys along the southern Oregon coast and freshwater fisheries habitat in the lower Cosumnes River in California. She has also been involved in habitat restoration planning and implementation projects in the Central Valley.

WALTER BOUREZ has 10 years of experience in the development and analysis of water operations model data, including data development, manipulation, and program execution. This experience includes the development of computer model operations and criteria, hydrologic research, crop

irrigation requirement studies and the development of current use estimates and alternative projections of future use.

GEORGE "BUZZ" LINK has over 22 years experience in real-time operation, analysis, and management of water and power systems. Mr. Link has special expertise in the development and application of mathematical computer models for water and power operations for planning purposes that incorporate water supply, water quality, power supply, flood control, recreation, and fish and wildlife considerations. Mr. Link is a registered professional engineer in the state of California. Prior to becoming president of Surface Water Resources, Incorporated, Mr. Link served as a water and power resources engineer with both Water Resources Management, Inc. and Resource Management International, and as a hydraulic engineer with the U.S. Bureau of Reclamation. Mr. Link developed operation simulation models for the U.S. Bureau of Reclamation that evaluate water and hydroelectric project attributes of existing and planned Central Valley Project facilities. These models facilitate evaluation of alternative water and hydroelectric project features and configurations and their effects on water supply and power generation.

RICK LIND has over 17 years of experience as a regulatory program manager, environmental planner and public involvement specialist in the energy, water and solid waste industries. He is a notable regulatory program management expert who has performed the spectrum of environmental review services, including analyses of licensing and permitting requirements, preparation of regulatory strategy reports, preparation of joint National Environmental Policy Act/State Environmental Regulatory documents, and compliance monitoring.

None of the project participants have a conflict of interest.

VI. COMPLIANCE WITH STANDARD TERMS AND CONDITIONS

SAFCA will comply with all terms and conditions.

Cost

Lower American River Instream Herbaceous Aquatic Cover and Dwarf SR Habitat Restoration Plan									
Project Phase and Task	Direct Labor Hours	Direct Salary and Benefits	Overhead Labor	Service Contracts		Materials	Misc. and Direct Costs	Total Cost	Subtotal/ Task
				Labor	Materials				
Task 1: Pre-construction Approval			\$1,050	\$7,000					\$8,050
Task 2: Site-specific Construction Design			\$375	\$2,500					\$2,875
Task 3: Monitoring Plan			\$450	\$3,000					\$3,450
Task 4: Construction			\$6,000	\$40,000	\$139,000				\$185,000
Task 5: Monitoring and Evaluation			\$22,500	\$150,000					\$172,500
Task 6: Final Report			\$750	\$5,000					\$5,750
Task 7: Progress Reports			\$0						\$0
Task 8: Operation and Maintenance			\$7,500	\$50,000					\$57,500
Subtotal			\$38,625	\$257,500	139,000				\$435,125
Contingency (10 percent)									\$43,513
Subtotal			\$38,625	\$257,500	139,000				
								Total Cost of Project	\$478,638

PROJECT COST SHARING			
Project Phase and Task	Total Cost by Task	CALFED Cost Share	SAFCA Cost Share
Task 1: Pre-construction Approval	\$8,050	\$8,050	
Task 2: Site-specific Construction Design	\$2,875	\$2,875	
Task 3: Monitoring Plan	\$3,450	\$3,450	
Task 4: Construction	\$185,000	\$185,000	
Task 5: Monitoring and Evaluation	\$172,500	\$172,500	
Task 6: Final Report	\$5,750	\$5,750	
Task 7: Progress Reports	\$0		
Task 8: Operation and Maintenance	\$57,500		\$57,500
Contingency (10 percent)	\$43,513	\$43,513	
Total	\$478,638	\$421,138	\$57,500

NONDISCRIMINATION COMPLIANCE STATEMENT

COMPANY NAME

Sacramento Area Flood Control Agency

The company named above (hereinafter referred to as "prospective contractor") hereby certifies, unless specifically exempted, compliance with Government Code Section 12990 (a-f) and California Code of Regulations, Title 2, Division 4, Chapter 5 in matters relating to reporting requirements and the development, implementation and maintenance of a Nondiscrimination Program. Prospective contractor agrees not to unlawfully discriminate, harass or allow harassment against any employee or applicant for employment because of sex, race, color, ancestry, religious creed, national origin, disability (including HIV and AIDS), medical condition (cancer), age, marital status, denial of family and medical care leave and denial of pregnancy disability leave.

CERTIFICATION

I, the official named below, hereby swear that I am duly authorized to legally bind the prospective contractor to the above described certification. I am fully aware that this certification, executed on the date and in the county below, is made under penalty of perjury under the laws of the State of California.

OFFICIAL'S NAME

F.I. Hodgkins

DATE EXECUTED

July 24, 1997

EXECUTED IN THE COUNTY OF

Sacramento

PROSPECTIVE CONTRACTOR'S SIGNATURE

PROSPECTIVE CONTRACTOR'S TITLE

Executive Director

PROSPECTIVE CONTRACTOR'S LEGAL BUSINESS NAME

Sacramento Area Flood Control Agency

Agreement No. _____

Exhibit _____

NONCOLLUSION AFFIDAVIT TO BE EXECUTED BY
 BIDDER AND SUBMITTED WITH BID FOR PUBLIC WORKS

STATE OF CALIFORNIA)

)ss

COUNTY OF Sacramento)F.I. Hodgkins

(name)

, being first duly sworn, deposes and

says that he or she is Executive Director of
 (position title)

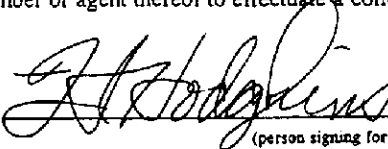
Sacramento Area Flood Control Agency

(the bidder)

the party making the foregoing bid that the bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation; that the bid is genuine and not collusive or sham; that the bidder has not directly or indirectly induced or solicited any other bidder to put in a false sham bid, and has not directly or indirectly colluded, conspired, connived, or agreed with any bidder or anyone else to put in a sham bid, or that anyone shall refrain from bidding; that the bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the bidder or any other bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other bidder, or to secure any advantage against the public body awarding the contract of anyone interested in the proposed contract; that all statements contained in the bid are true; and, further, that the bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid, and will not pay, any fee to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof to effectuate a collusive or sham bid.

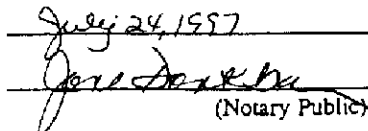
DATED: July 24, 1997

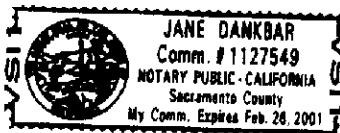
By



(person signing for bidder)

Subscribed and sworn to before me on

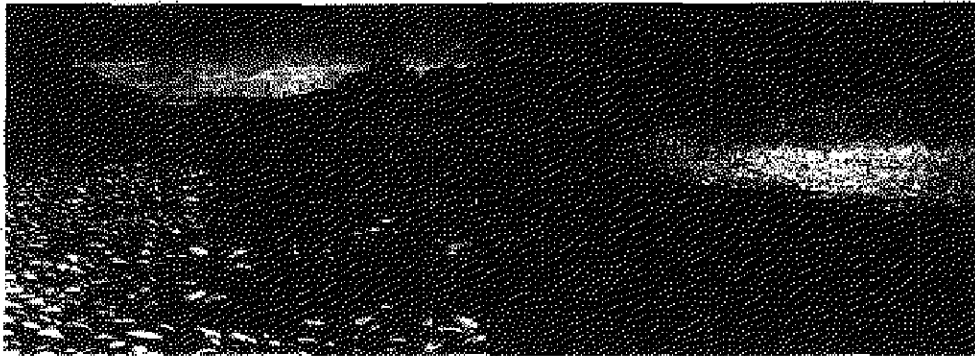
July 24, 1997

 (Notary Public)



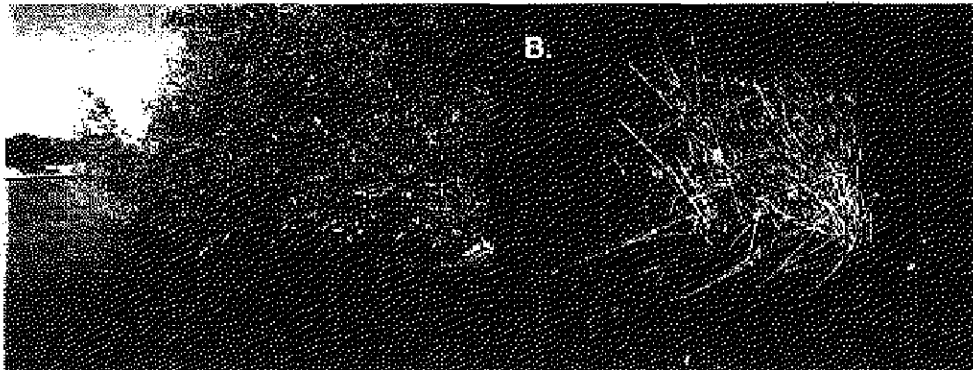
(Notarial Seal)

Lower American River Instream Herbaceous Aquatic Cover
and Dwarf SRA Habitat Restoration Plan

Figure 1. Current Conditions



The upper portion of the LAR is semi-constrained, with little natural meandering due to highly resistant clay-rock formations. The near-shore bank edge is generally a scour zone, with little development of dense, riparian vegetation characteristic of more downstream portions. However, there are special types of riverine vegetation adapted to this reach of the river.



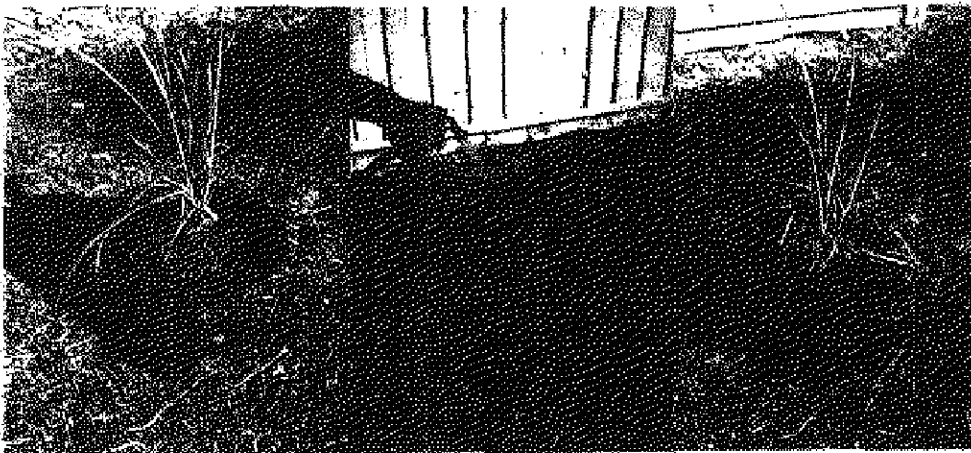
A. Left, Dwarf Shaded Riverine Aquatic habitat, consisting of plants that are short in stature, multi-branched, flexible (to bend with the current), and have tenaceous root systems. B. Another habitat type -- instream herbaceous cover -- comprised of herbaceous species adapted for growth at the water's edge and in fast-moving water.

Lower American River Instream Herbaceous Aquatic Cover
and Dwarf SRA Habitat Restoration Plan

Figure 2. The Use of Ballast Buckets for
Creating Dwarf SRA and Instream Herbaceous Cover



Ballast buckets consist of mixing scoria rock and soil in an organic bucket, and installing the appropriate plants. The plants will be allowed to grow for several months to insure that the roots are thoroughly growing within the rock / soil mixture.



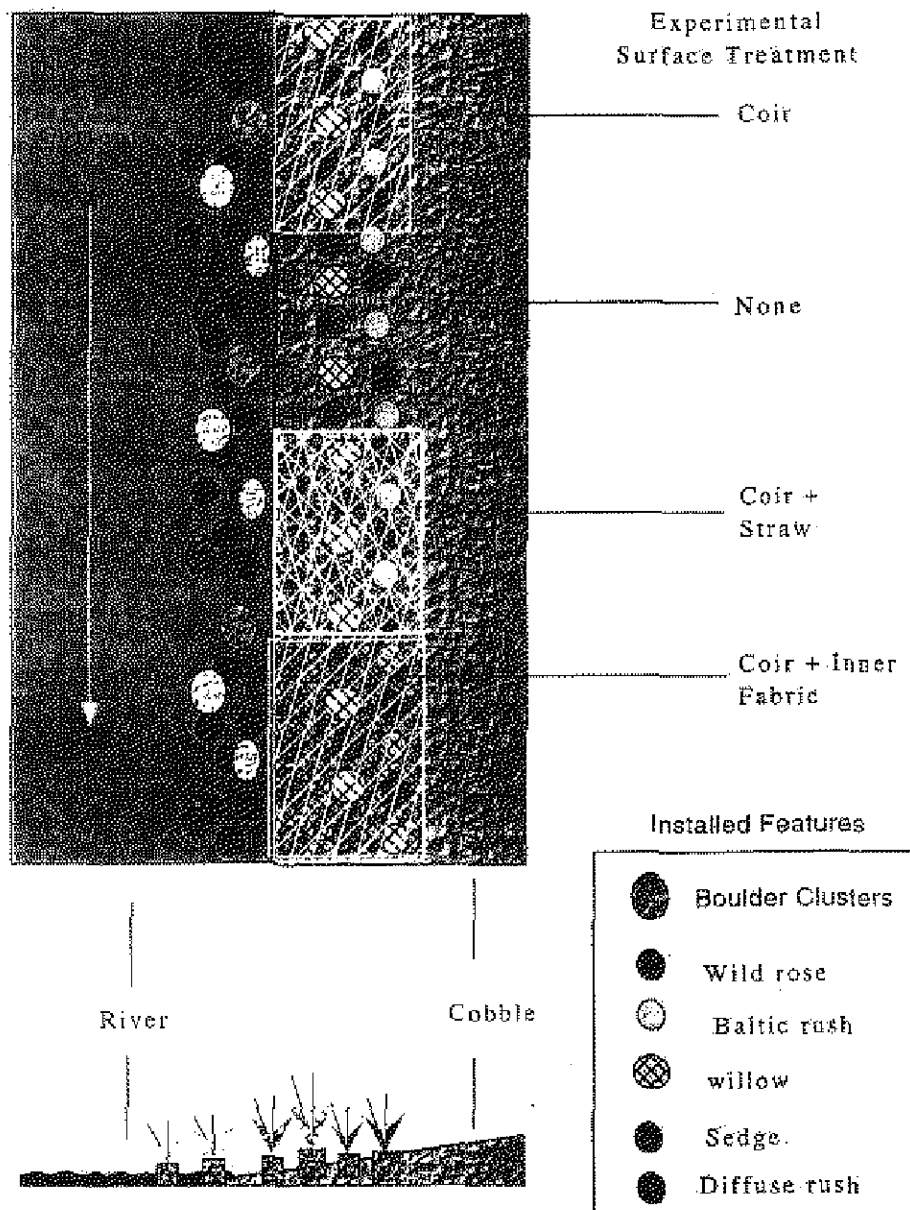
Lower American River Instream Herbaceous Aquatic Cover
and Dwarf SRA Habitat Restoration Plan

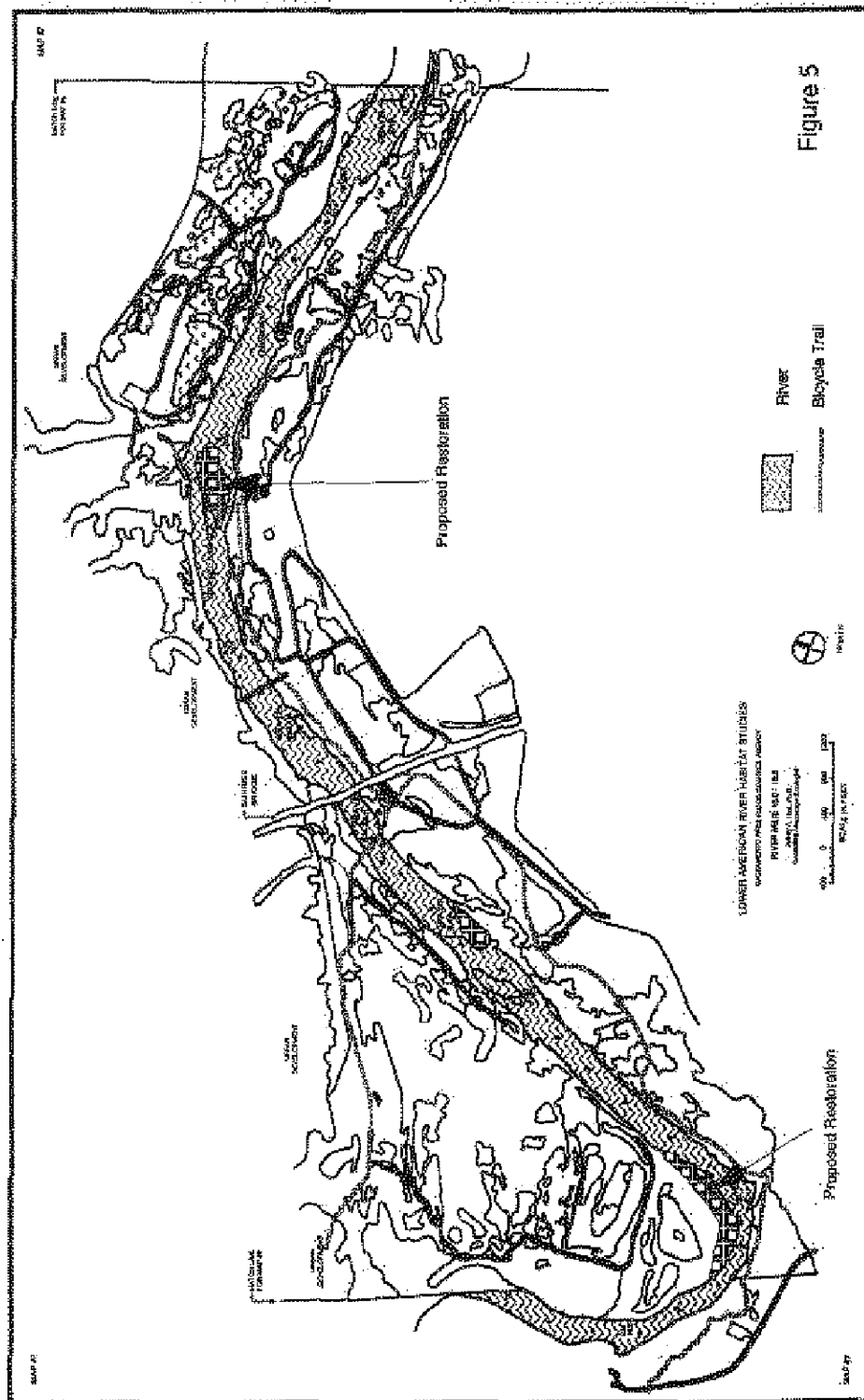
Figure 3. Installing Ballast Buckets in LAR

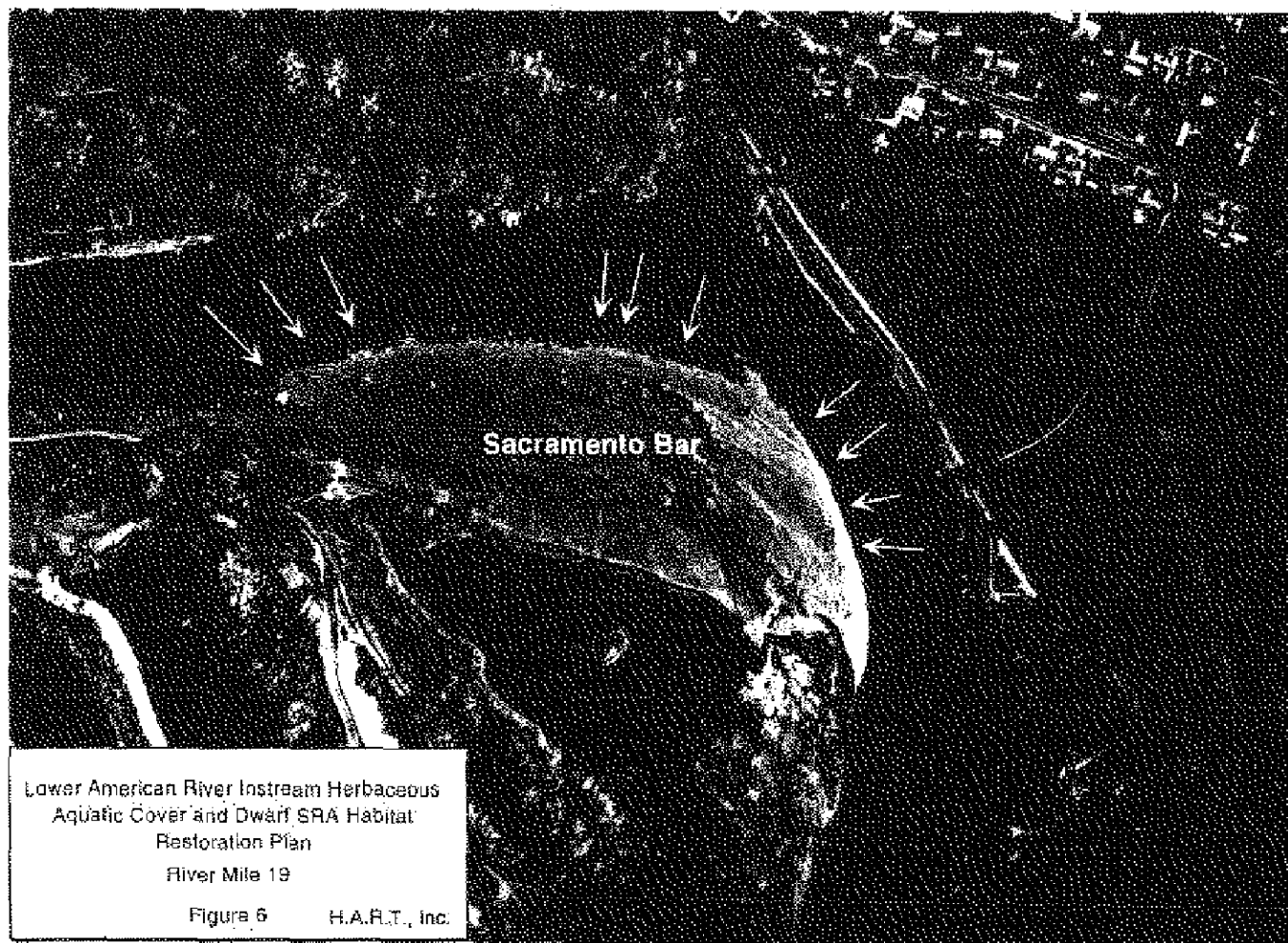


Lower American River Instream Herbaceous Aquatic Cover and Dwarf SRA Habitat Restoration Plan

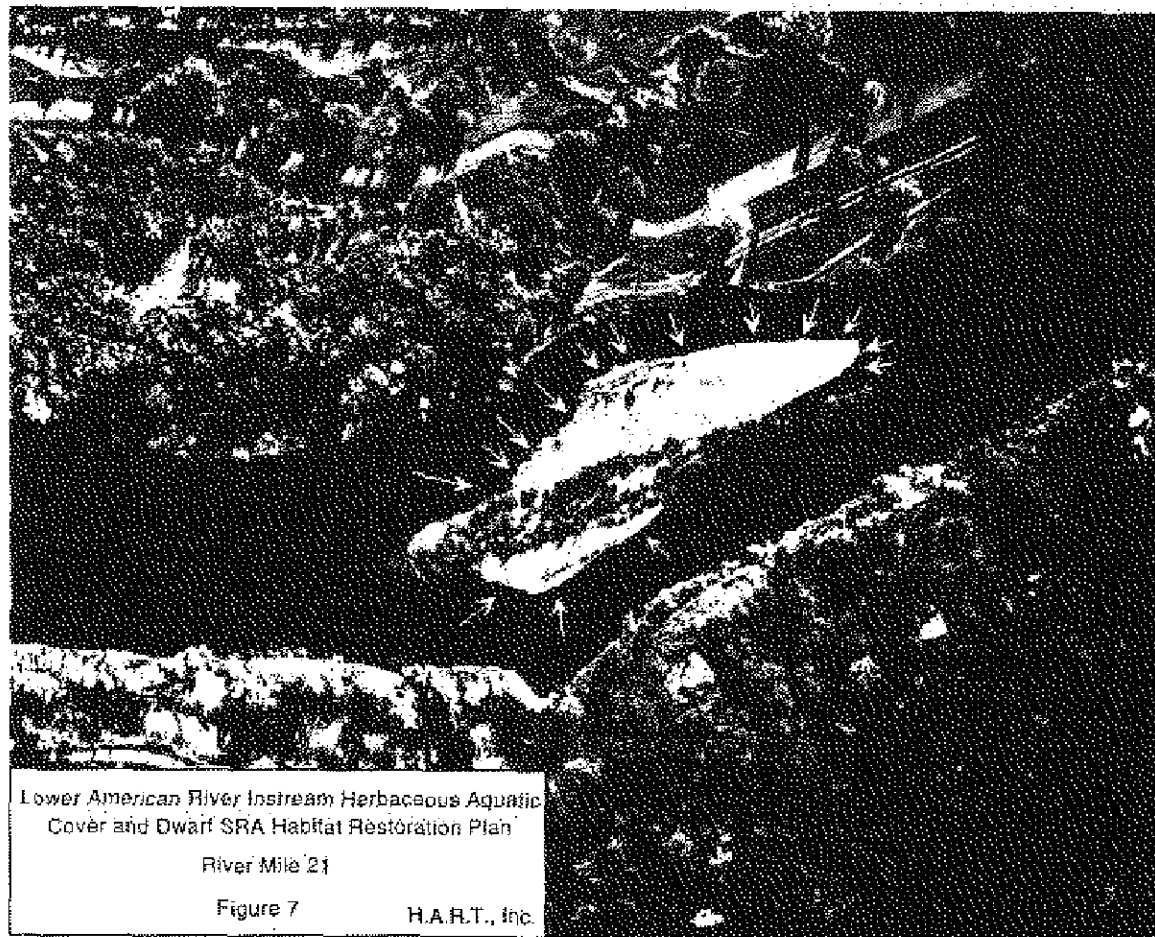
Figure 4. Installing Dwarf SRA and Instream Herbaceous Cover







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Lower American River Instream Herbaceous Aquatic Cover and Dwarf SRA Habitat Restoration Plan

Figure 8. A previous experiment on the lower American River. Different combinations of fabric and plants were used to test the effectiveness of holding and attracting soil on riprap.



Above: The first step was to place soil, using a pressurized water hose, into the riprap.



Some of the test sites were covered with coir (coconut) fabric, placed in shallow trenches, and rock used for anchoring.

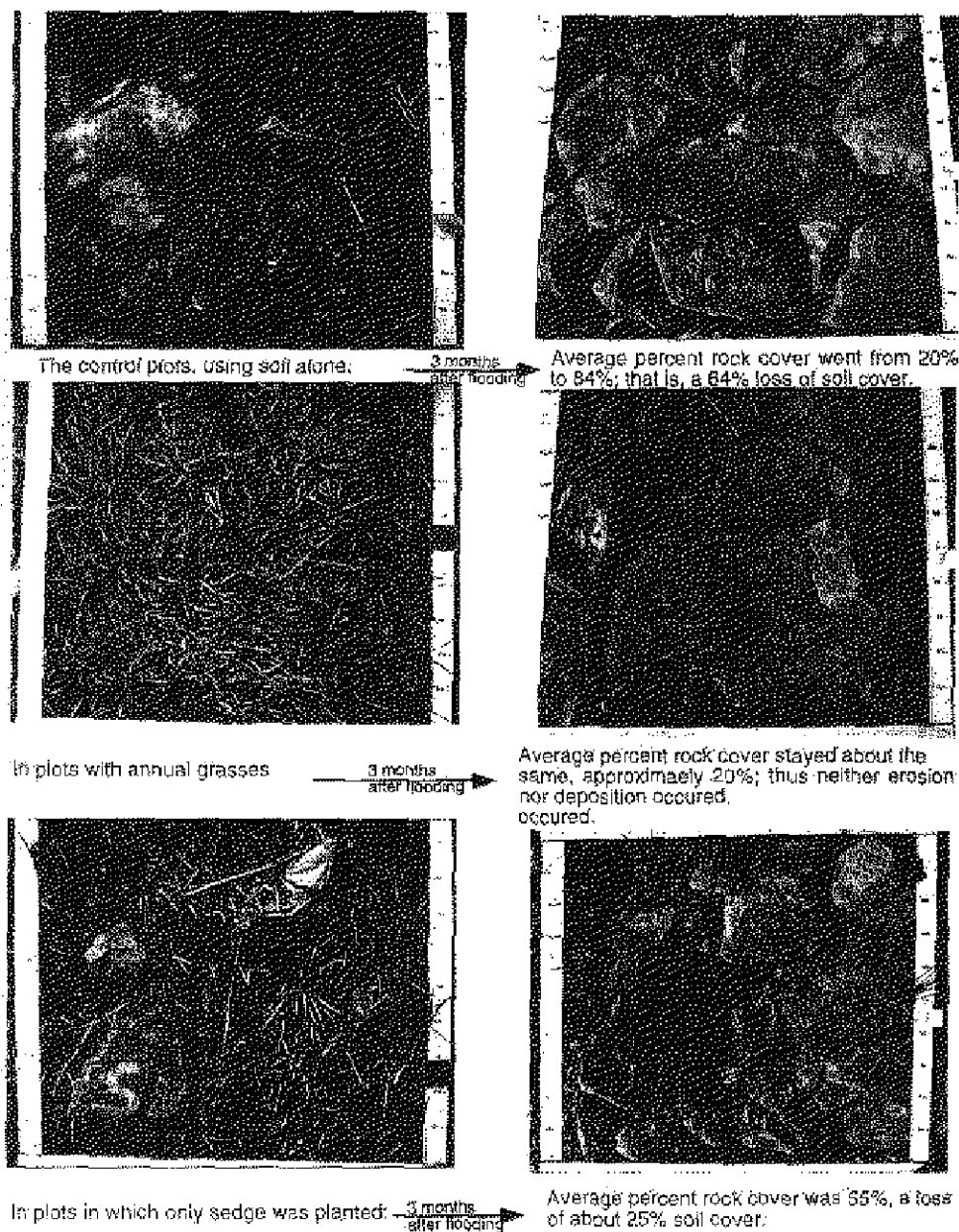


In the plots lacking coir, plants were installed in the soil between the rocks.

In plots having coir, the plants were installed through the fabric.

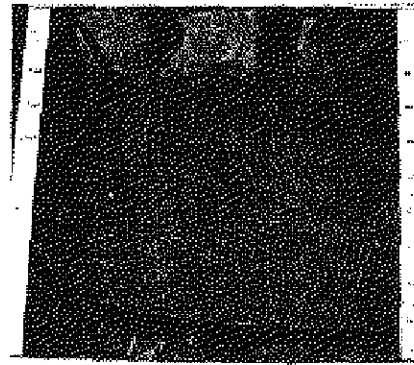
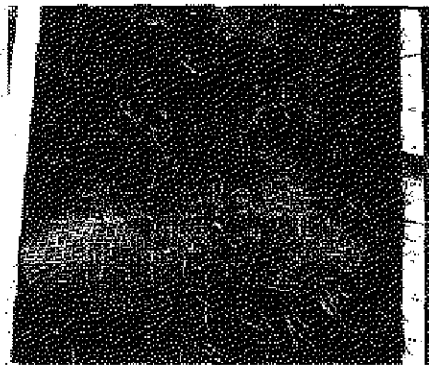
Lower American River Instream Herbaceous Aquatic Cover and Dwarf SRA Habitat Restoration Plan

Figure 9. Experimental Procedure: Different combinations of sedge, annual grasses, coir fabric, and an inner blanket were employed to test the relative effectiveness of the different treatments. After more than 3 months of flooding, the following results were observed:



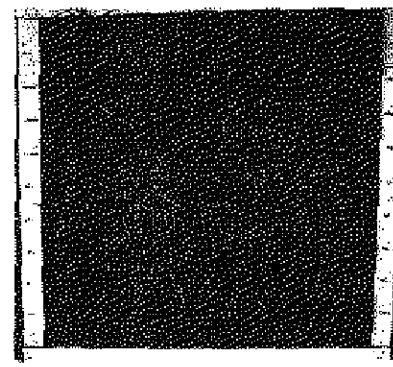
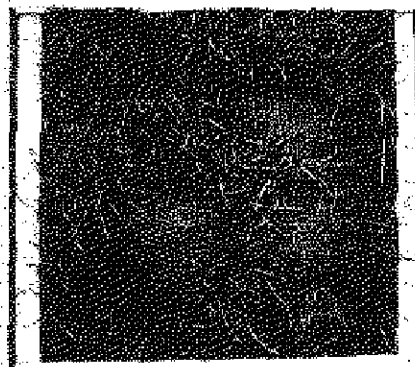
Lower American River Instream Herbaceous Aquatic Cover and Dwarf SRA Habitat Restoration Plan

Figure 30: The addition of coir fabric to the experimental design resulted in significant gains in deposition



The application of coir + annual grasses 3 months after flooding

Resulted in considerable deposition, with percent rock exposed after flooding averaging 9%, an 11% decrease of rock exposed.



The application of coir + an inner blanket + annual Grasses + sedge

3 months after flooding

Resulted in increased deposition, with percent rock exposed after flooding being only 1%, a 19% decrease of rock exposed.

Conclusion: The greatly diminished habitat values on riprap and similar materials have been of great concern to the environmental community; understandably, successful methods in vegetating revetment sites would offer considerable opportunity for creating riverine habitat values in the Delta. To date, successful establishment efforts have been marginal. The results of these experiments highlight the importance of herbaceous plants and landscape fabric in providing the amount and quality of roughness necessary to protect revetment sites from scour and to encourage sediment deposition, conditions necessary for successful riverine habitat restoration.

Lower American River Task Force

STATEMENT OF SUPPORT

for

CALFED APPLICATION

(Ratified by the Lower American River Task Force on July 15, 1997)

The Lower American River Task Force has reviewed and supports the attached application to CALFED for restoration of key sites on the Lower American River. We strongly urge that these valuable projects be funded. They will provide critical information for the development of restoration opportunities for this important river system.

Community Groups

1. American River Parkway Foundation
2. California State University, Sacramento
3. Campus Commons Park Corporation
4. Citizens-at-Large
5. Dos Rios Neighborhood Association
6. Natomas Community Association
7. River Park Neighborhood Association
8. Sierra Oaks Neighborhood Association

Environmental Interests

1. Environmental Council of Sacramento (ECOS)
2. Environmental Defense Fund
3. Friends of the River
4. Protect American River Canyons (PARC)
5. Save the American River Association (SARA)
6. Sierra Club, Mother Lode Chapter

Flood Control Agencies

1. American River Flood Control District
2. City of Sacramento Utilities
3. City of West Sacramento
4. Reclamation District 900
5. Reclamation District 1000
6. Sacramento Area Flood Control Agency (SAFCA)
7. State Reclamation Board
8. State Department of Water Resources

Recreation Interests

1. California Exposition and State Fair
2. Sacramento County Parks and Recreation

Resource Agencies

1. State Department of Fish and Game
2. State Lands Commission
3. U.S. Fish and Wildlife Service